Pediatric Headache Management in Various Clinical Settings

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Case

Sarah is a 14-year-old girl who complains of headache for the past year.

Comprehensive Headache History

- Frequency
- Duration
- Location
- Quality
- Severity
- Associated symptoms
- Comorbidities
- Gastrointestinal complaints more common in children
- Migraine equivalents
- PMH, including medications
- SH
- FH
- Neurological exam

She describes two types of headache. The first type of headache (type 1) occurs once a month. The attacks last for 24 hours and the pain is severe enough to stop all activities. Sarah describes the headache as throbbing with maximum intensity on her forehead. She cannot identify trigger factors and has no warning signs before the onset of pain. The headache is almost always associated with loss of appetite, feeling sick, light intolerance, noise intolerance and pallor. In most, but not all, attacks she may vomit. She feels better after rest and sleep. Acetaminophen helps a little.

The second type of headache (type 2) occurs at least four days per week and last between 2 and 3 hours each. Headache does not stop normal activities and is described as ‘just sore’ around the head. There are no other associated symptoms and, in particular, she is able to have normal meals, has no nausea and does not vomit. Neither light nor noise bother her during attacks. After an episode of throat infection, the headaches became daily. She finds relief from rest and she only occasionally treats these headaches with acetaminophen.

Between headaches, she is back to her normal self and has no other illnesses. Sarah and her mother are concerned about the headaches, their frequency and the number of school days lost due to headache. Physical and neurological examinations were normal.

Headaches

- Headaches affect 48.9% of the population globally
- Headaches is the fourth most common chief complaint in the ED
- The International Classification of Headaches Disorder, 3rd edition (ICHD-3) divides headaches into 3 categories:
  - Primary headaches
  - Secondary headaches
  - Neuropathies and facial pains

Primary vs Secondary Headaches

TABLE. THE SNOOP MNEMONIC FOR SECONDARY HEADACHE DISORDER RED FLAGS		
Mnemonic	**History features**	**Physical examination features**
Systemic	History of malignancy, immunosuppression, or HIV or complaints of fever, chills, night sweats, myalgias, weight loss, or jaw claudication	Abnormal systemic examination, including blood pressure and temperature
Neurologic	Focal or global neurologic symptoms, including change in behavior or personality, diplopia, transient visual obscurations, pulsatile tinnitus, motor weakness, sensory loss, or ataxia	Abnormal neurologic examination
Onset, sudden	Headache reaches peak intensity in less than 1 minute (thunderclap)	
Onset age <5 or >65	New-onset headache before age 5 years New-onset headache after age 65	
Pattern change	Progressive headache (evolution to daily headache) or change in headache characteristics	
	Precipitated by Valsalva maneuver	
	Postural aggravation	
Papilledema	n/a	Papilledema
Pregnancy	New-onset headache during pregnancy Change in headache during pregnancy	
Phenotype of rare headache	Trigeminal autonomic cephalalgia; hypnic; exercise-, cough-, or sex-induced	

Primary Headaches

	Migraine	**Tension-type headache**	**Trigeminal autonomic cephalalgia**
Location	Bilateral in young children; unilateral in 60-70% in adolescent and young adults	Bilateral	Always unilateral, usually begins around the eye or temple
Characteristics	Gradual onset; pulsatile; moderate to severe intensity; aggravated by routine physical activity	Pressure or tightness that waxes and wanes	Pain begins quickly, reaches a crescendo within minutes; pain is deep, continuous, excruciating, and explosive in quality
Patient appearance	Patient prefers to rest in a dark, quiet room	Patient may remain active or may need to rest	Patient remains active
Duration	2 to 72 hours	Variable	30 minutes to 3 hours
Associated symptoms	Nausea, vomiting, photophobia, phonophobia* may have aura (usually visual, but can involve other senses or cause speech or motor deficits)	None	Ipsilateral lacrimation and redness of the eye; stuffy nose; rhinorrhea; pallor; sweating; Horner syndrome; focal neurologic symptoms rare; sensitivity to alcohol

ICHD-3 CRITERIA FOR PEDIATRIC MIGRAINE

Migraine—Episodic headache with ≥5 attacks lasting 2-72 h that cannot be better explained by another diagnosis or medication overuse, with ≥2 of these characteristics:	■ Bilateral location (vs unilateral predilection in adults. Although usually frontotemporal, rare occipital headache in children calls for diagnostic caution.)	■ Pulsating quality ■ Moderate to severe pain ■ Aggravation by routine physical activity
Plus ≥1 of these symptoms:	■ Nausea or vomiting	■ Photophobia and phonophobia

ICHD-3 CRITERIA FOR TENSION-TYPE HEADACHE (TTH)

TTH TYPE	FREQUENCY	DURATION	NAUSEA	PHONOPHOBIA/ PHOTOPHOBIA
Infrequent episodic	≤10 episodes occurring on ≤1 d monthly on average (<12 d/y)	30 min-7 d	No	≤1 (but not both)
Frequent episodic	≤10 episodes occurring on 1-14 d/mo on average for >3 mo	30 min-7 d	No	≤1 (but not both)
Chronic	≥15 d/mo for >3 mo (≥180 d/y)	Hours to days or unremitting	Mild	≤1 (but not both)

ICHD-3 CRITERIA FOR TRIGEMINAL AUTONOMIC CEPHALALGIA (TAC)

TAC TYPE	NO. OF ATTACKS	SEVERITY	FREQUENCY	DURATION
Cluster	≥5	Very severe	Every 2/d-8/d	15-180 min (untreated)
Short-lasting, unilateral, neuralgiform headache attacks with conjunctival injection and tearing (SUNCT)	≥20	Moderate to severe	≥1/d	1-600 sec, as single or multiple stabs or in sawtooth pattern
Paroxysmal hemicrania	≥20	Severe	≥5/d	2-30 min[a]
Hemicrania continua	Persistent	Exacerbations of ≥moderate intensity	N/A	≥3 mo[b]

You have ruled out secondary headaches, so how do you manage acute headaches?

Acute management in the outpatient setting

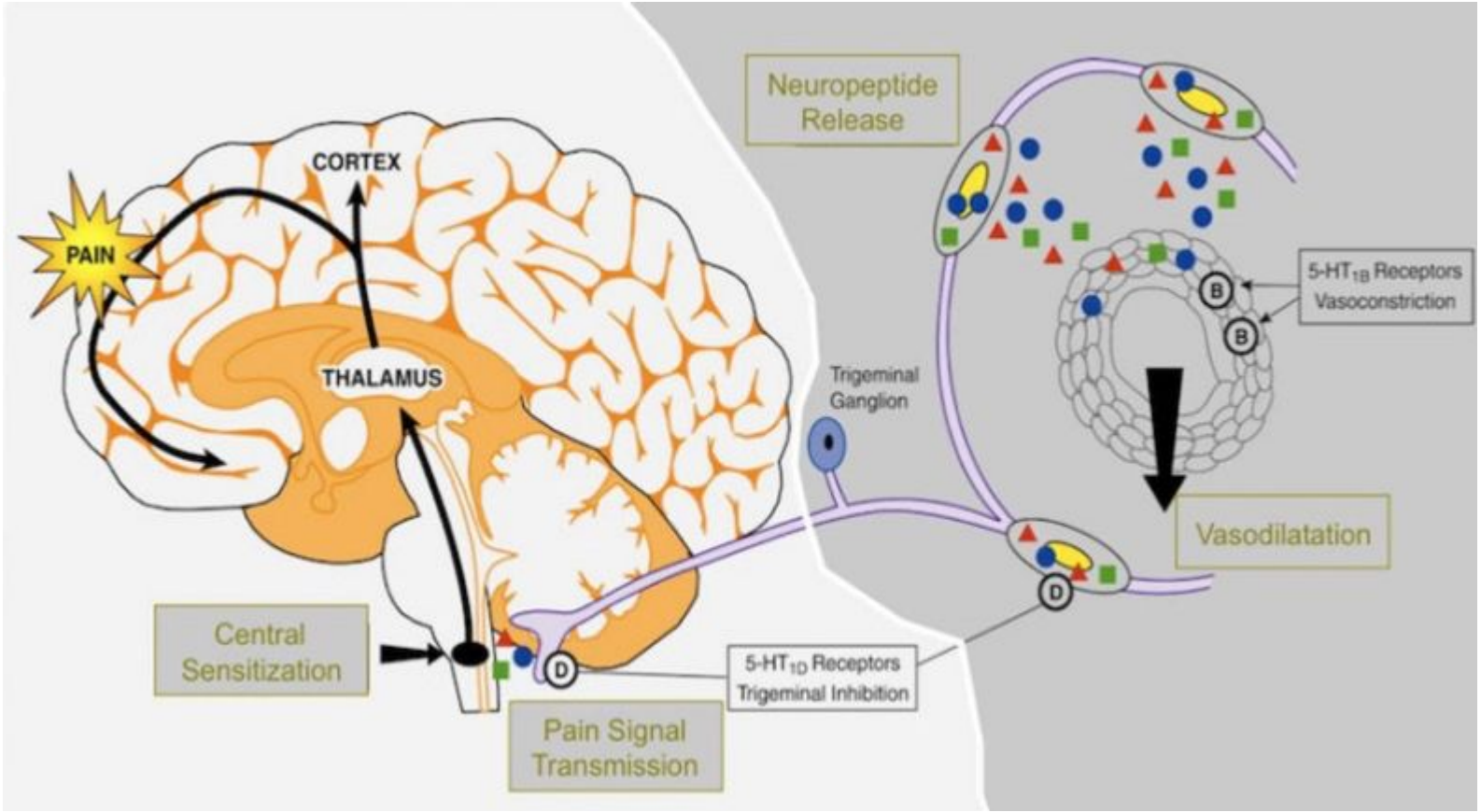
- Goal of acute treatment of headache should be a consistent response with minimum side effects and a rapid return to normal function
- Avoid the development of medication overuse headache (MOH)
- Which medications do you recommend?

Tier 1 (analgesics)

- Acetaminophen 15mg/kg per dose, may be repeated in 2-4 hours, max single dose 1000mg
- Ibuprofen 10mg/kg per dose, may be repeated in 4-6 hours, max daily dose 40mg/kg
- Naproxen 5mg/kg per dose, may be repeated in 8-12 hours, may daily dose 1000mg
- Do use more than x14/month

Tier 2 (triptans)

- For children at least 5 years of age who have moderate to severe migraine attacks, or acute migraine of any severity that is refractory to analgesics
- For children who cannot swallow pills or have significant nausea/vomiting:
  - ODT: rizatriptan and zolmitriptan a
  - Nasal sprays: sumatriptan and zolmitriptan
- >10 years old and >50kg
  - Almotriptan 12.5 mg tablet
  - Rizatriptan 5 mg tablet or melt (the dose should be decreased in patients taking concomitant propranolol)
  - Sumatriptan 50 mg tablet
  - Sumatriptan 10 mg nasal spray
  - Zolmitriptan 5 mg tablet, melt, or nasal spray
- 6-10 years of age and <50kg
  - Half the above doses
- Do not use more than x9/month


Neuropeptide Release
CORTEX
PAIN
THALAMUS
Trigeminal Ganglion
5-HT1B Receptors Vasoconstriction
B
B
Vasodilatation
D
Central Sensitization
D
5-HT1D Receptors Trigeminal Inhibition
Pain Signal Transmission

Tier 3 (combination)

- For children ⩾5 years and adolescents who have acute migraine attacks that are refractory to monotherapy with other acute migraine medications
- For example, Triptan taken with naproxen 5 mg/kg per dose

Timing is important!

Patient should take abortive medication at onset of headache

CHOC Care Guidelines

CHOC Care Guidelines - Outpatient

Indications for Referral

- Secondary headache
- Headaches associated with mood disturbance or anxiety
- Uncertain diagnosis
- Headaches refractory to primary care management
- Frequent headaches unresponsive to typical therapy
- Need for multidisciplinary headache program

Acute management in the emergency room

- Primary headaches presented to the ED include: migraine w/ or w/o aura 15.6-58% (Ward et al 2001)
- For children who have failed to improve with analgesics:
  - IV fluids, IV prochlorperazine (0.15 mg/kg) followed by IV ketorolac (0.5 mg/kg). Pretreatment with diphenhydramine may prevent potential dystonic reactions associated with prochlorperazine.
  - Alternatives:
    - Sumatriptan 3-6mg SQ
    - Metoclopramide (Reglan) 0.2mg/kg IV
    - Dihydroergotamine 0.5mg over 3 minutes IV for children <25 kg or age ≤9 years and 1 mg over three minutes for children age ≥10 years
    - Valproic acid 15-20mg/kg IV, max 1g
    - Magnesium sulfate (>14 years)
    - Dexamethasone 4-8mg IV as single dose, decreases rate of recurrence in ED

Status Migrainosus

A. A headache attack fulfilling criteria B and C

B. In a patient with migraine without aura and/or migraine with aura, and typical of previous attacks except for its duration and severity

C. Both of the following characteristics:

1. unremitting for >72 h

2. pain and/or associated symptoms are debilitating

D. Not better accounted for by another ICHD-3 diagnosis

Inpatient management of status migrainosus

- Approximately 6–7% of patients fail acute treatment in the emergency department (Kabbouche and Cleves 2010).
- IV DHE
  - DHE protocols - Kabbouche et al. 2009
- Sodium valproate - if DHE is contraindicated, infective or in combination

CHOC Care Guidelines

CHOC Care Guidelines - Status Migrainosus

Medication Overuse Headaches (MOH)

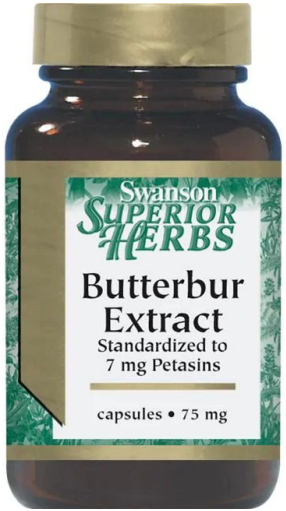
- Risk for MOH appears to be highest with opioids, butalbital-containing combination analgesics, and triptans
- Counsel families to limiting use of abortive medications

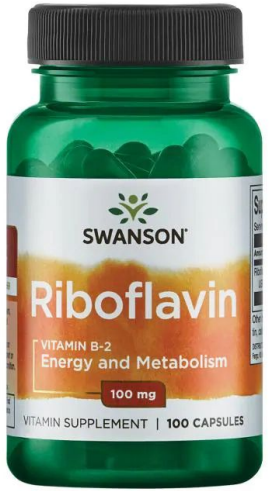
Prophylactic Medications

- TCAs
  - Amitriptyline
- Antiepileptics
  - Topiramate 2-4mg/kg/day
  - Depakote 15-20mg/kg/day
  - Keppra
- Anti-serotonergics
  - Periactin 0.2-0.4mg/kg/day

Other Prophylactic Medication

- Antihypertensives
  - Propranolol
  - Verapamil
- Botox
- Supplements
  - Riboflavin 400mg daily
  - Butterbur 75mg or 150 mg daily
  - Magnesium oxide 400mg daily
  - Coenzyme Q10





Lifestyle Modifications

- www.headachereliefguide.com
- Good sleep hygiene
- Well-balanced diet
- Sufficient hydration
- Regular exercise
- Minimize stressors

Questions?

Thank you!